REMARKS

The Amendments

The claims are amended to make clear that components (A) and (B) comprise, respectively, the polyamide and the polyolefin. This is evident in the disclosure and in the dependent claims. The claims are further amended to require at least one polyolefin homopolymer in the polyolefin component. Support for this amendment is found throughout the disclosure, for example, at page 8, lines 13-25. Claims 18 and 26 are further amended to be consistent with the amendments to the claims they depend upon and to spell out the abbreviated compounds to address the 35 U.S.C. §112 rejection. The amendments do not narrow the scope of the claims and/or were not made for reasons related to patentability. The amendments should not be interpreted as an acquiescence to any objection or rejection made in this application.

To the extent that the amendments avoid the prior art or for other reasons related to patentability, competitors are warned that the amendments are not intended to and do not limit the scope of equivalents which may be asserted on subject matter outside the literal scope of any patented claims but not anticipated or rendered obvious by the prior art or otherwise unpatentable to applicants. Applicants reserve the right to file one or more continuing and/or divisional applications directed to any subject matter disclosed in the application which has been canceled by any of the above amendments.

The Rejection under 35 U.S.C. §112, second paragraph

The rejection of claims 15-19 and 23-27 under 35 U.S.C. §112, second paragraph, is respectfully traversed.

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The abbreviated terms are replaced with the full name terms, rendering this part of the rejection moot. It should be noted that, although the terms "linear low density polyethylene" and "very low density polyethylene" contain relative terms, these are not indefinite because these terms – as well as their abbreviations previously used – are well known terms of art. One of ordinary skill in the art would reasonably know the metes and bounds of these terms despite the relative words contained as part of the term.

Regarding the allegation that the term polyolefins does not include copolymers of polyolefins, applicants respectfully disagree. The definition of polyolefins in Grant & Hackh's Chemical Dictionary excerpt provided with the last Office Action specifically includes copolymers including polyolefins within the polyolefin term. An excerpt from Concise Encyclopedia Chemistry, provided herewith, also includes copolymers within the polyolefin term. Regardless, the claims, including claims 18 and 26, are now amended to require at least one polyolefin homopolyer in the polyolefin component. This should render the rejection moot.

For the above reasons, it is urged that the meaning of the claims would have been reasonably clear to one of ordinary skill in the art. Thus, the rejection under 35 U.S.C. §112, second paragraph, should be withdrawn.

The Rejection under 35 U.S.C. §103

The rejection of claims 12-14, 20, 28 and 31 under 35 U.S.C. §103, as being obvious over Nishihara (U.S. Patent No. 6,093,760) is respectfully traversed.

Nishihara provides no disclosure or suggestion of a composition comprising a polyolefin. The reference relates to a flame retardant for a styrene resin. However, a styrene resin or polystyrene is not a polyolefin. As defined in the Grant & Hackh's Chemical

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Dictionary excerpt provided with the last Office Action and in the excerpt from Concise Encyclopedia Chemistry, provided herewith, a polyolefin is a polymer derived from a "simple olefin" which is an "alkene." A styrene is an aromatic compound and, thus, not an alkene. Further, one of ordinary skill in the art would know there is a clear distinction between polystyrenes and polyolefins. See, e.g., col. 8, lines 41-48, requiring that the styrene resin in Nishihara be from an aromatic vinyl monomer.

Nishihara does disclose styrene resins based on styrene copolymers, e.g., at col. 8, line 8, to col. 10, line 45. Included are styrene-butadiene-styrene (SBS) copolymers. However, there is no disclosure regarding the use of a homopolymer other than polystyrene. Thus, there is no disclosure of a "polyolefin homopolymer," as recited in the currently amended claims. Further, there is no suggestion from Nishihara to use its flame retardants and other components in a composition comprising a polyolefin homopolymer. Nishihara is clearly directed to compositions based on styrene resins or styrene copolymers and there is no suggestion whatsoever regarding a composition with a polyolefin homopolymer.

Regarding claims 15-19 and 23-27, these claims recite particular polyolefin homopolymers and particular combinations with other components. Nishihara, obviously, fails to disclose or suggest such specifics and these claims are further clearly not obvious from the reference.

For the above reasons, it is urged that Nishihara, considered as a whole, fails to render the claimed invention obvious to one of ordinary skill in the art. Thus, the rejection under 35 U.S.C. §103 should be withdrawn.

It is submitted that the claims are in condition for allowance. However, the Examiner is kindly invited to contact the undersigned to discuss any unresolved matters.

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The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

John A. Sopp
Registration No. 33,103
Attorney for Applicants

MILLEN, WHITE, ZELANO
& BRANIGAN, P.C.
Arlington Courthouse Plaza 1
2200 Clarendon Blvd. Suite 1400
Arlington, Virginia 22201
Telephone: (703)243-6333
Facsimile: (703) 243-6410
Attorney Docket No.: ATOCM-333

Date: December 14, 2005

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Concise Encyclopedia
Chemistry

Translated and revised by
Mary Eagleson

catalytic reduction of
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:composition of diazo-
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·elative molecular mas-
melting points around
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and in the presence of
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because of their highly
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abb. **PMP**: a polyole-
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id black phosphorus,
xamples of polymor-
de (zinc blende and
:alcite, aragonite and
(five different modi-

fications). The occurrence of the various modifica-
tions depends on external conditions (pressure, tem-
perature, crystallization conditions).

The interconversion of modifications is called
transformation. A distinction is made between enan-
tiotropic pairs of modifications, which can intercon-
vert (reversible conversion, *enantiotropism*), and
monotropic pairs of modifications, in which the con-
version can occur in only one direction (irreversible
conversion, *monotropism*). The difference in be-
havior can be understood from the vapor pressure
curves (Fig.).
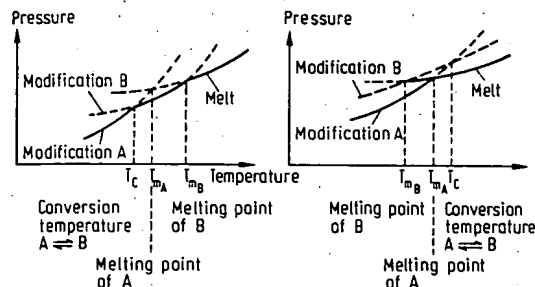
Polymorphism. Vapor pressure curves (schematic) *left* of an
enantiotrophic pair and *right* of a monotropic pair of modifi-
cations.

Under any given pressure and temperature, other
than the conversion points, only one modification is
stable, the one with the lowest vapor pressure. The
left figure shows the vapor pressure curves of two
enantiotropic modifications A and B. As the melt
cools, at the melting point T_{mB}, modification B crys-
tallizes. When the conversion temperature T_c is
reached, the vapor pressure curves intersect, and the
two forms are in equilibrium. Below this tempera-
ture, modification A forms. When the substance is
heated, the reverse sequence of phases leads to A-B
melts. For example, the α-, γ- and δ-modifications of
iron interconvert reversibly at 1183, 1661 and 1812 K.
Often the conversion rate in the solid phases is so
slow that even modifications which are unstable
under the conditions can be kept for a long time (see
Metastable state). For example, quartz glass, an
amorphous modification of silicon dioxide, is unstable
below 1978 K. However, quartz glass can exist indefi-
nitely, even under moderate heating; it is thus in a
metastable state. Only if the transformation rate is
considerably accelerated by heating to glowing, espe-
cially in the presence of impurities, does the crystal-
line modification crystobalite appear ("deglassifica-
tion").

If its temperature changes very slowly, the phase
behavior of sulfur corresponds completely to the solid
curve shown in the left figure. If rhombic α-sulfur
(modification A) is very slowly heated, it is trans-
formed at T_c = 368.6 K into monoclinic β-sulfur
(modification B), which melts at 392.1 K (T_{mB}. How-
ever, if α-sulfur is rapidly heated, it melts, without
previous conversion to β-sulfur, at T_{mA} = 387.1 K
(dashed curve). If the melt is cooled, at T_{mB} β-sulfur
first forms, and if the temperature then drops very
slowly, α-sulfur is formed. However, β-sulfur can eas-

ily be supercooled, and remains as a metastable state
for a short time even at room temperature before it is
transformed into α-sulfur.

The figure on the right shows the corresponding
behavior of a pair of monotropic modifications A and
B. Here the transformation temperature T_c is above
the melting point T_{mA}, and therefore the A modifica-
tion melts before it reaches the conversion tempera-
ture. A. is stable over the entire temperature range of
the solid state, and B is unstable. However, it is often
possible to cool a melt to the point T_{mB}, at which
point the metastable B modification is formed; as a
result of its higher vapor pressure, it is converted to A
sooner or later. A conversion in the opposite direc-
tion is in principle impossible. For example, with
phosphorus only the direct transformations of the
white into the red, and the red into the black modifi-
cation can occur; white phsophorus cannot be ob-
tained directly from the other modifications, but only
by condensation of phosphorus vapor.

Since the melting point depends on the pressure, it
can happen that a transformation which is mono-
tropic under normal pressure becomes enantiotropic
when the pressure is increased. This is the basis of the
production of synthetic diamonds at a pressure of $p \geq$
$5.5 \cdot 10^3$ MPa and a temperature $T \geq 1730$ K.

Polymyxins: cyclic peptides containing fatty acids
produced by *Bacillus polymyxa*; they have antibiotic
effects against gram-negative bacteria. The P. are
cyclic branched heptapeptides with an L-α,γ-
diaminobutyric acid group (Dbu) in the branch posi-
tion; it is linked by its γ-amino function to the car-
boxyl group of a threonine group to form the ring
structure. Its α-amino function is bound to a tetrapep-
tide sequence. The terminal amino group is linked to
a branched fatty acid group, either (+)-6-methyloc-
tanoic acid (MOA; also called (+)-isopelargonic
acid) or 6-methylheptanoic acid (also called isooc-
tanoic acid, IOA) (Fig.).

Ⓡ – Dbu – Thr – Ⓧ – Dbn – Ⓨ – Ⓩ – Dbu – Dbu – Thr
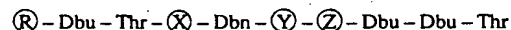
Polymyxin	R	X	Y	Z
B₁	MOA	Dbu	D-Phe	Leu
B₂	IOA	Dbu	D-Phe	Leu
D₁	MOA	D-Ser	D-Leu	Thr
D₂	IOA	D-Ser	D-Leu	Thr
Colistin A = E₁	MOA	Dbu	D-Leu	Leu
Colistin B = E₂	IOA	Dbu	D-Leu	Leu
Circulin A	MOA	Dbu	D-Leu	Ile

Peptide antibiotics of the polymyxin family.

The P. are toxic to human beings. Because they are
hydrolysed and not absorbed when administered or-
ally, however, they can be used to treat infections of
the gastrointestinal tract.

Polynose fibers: see Rayon.
Polynucleotide: see Nucleotides.
Polynucleotide ligases: same as DNA ligases
(see).

Polyolefins: 1) collective term for organic com-
pounds which contain several olefinic double bonds in
the molecule, such as the polyenes.

2) abb. **PO**, thermoplastic polymerization products
of alkenes (olefins). Some industrially important P.
are Polyethylene (see), Polypropylene (see), Poly-
isobutylene (see), Polybut-1-ene (see) and Poly-4-

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methylpent-1-ene. The copolymers of ethylene with propylene and other alkenes and the copolymers of alkenes with vinyl monomers are also considered to be P.

Polyolefin fibers: synthetic fibers consisting of at least 85% polyolefin, especially polyethylene and polypropylene. *Polyethylene* and *polypropylene fibers* are obtained by melt spinning. The spun threads are cooled in air or water, then stretched to six times their original length. P. are elastic, insoluble in most organic solvents, resistant to acids and bases, and are very good electrical insulators. P. are used for rain and work clothing, fish nets, ropes, furniture upholstery, plush fabrics, electrical insulation, etc.

The most important trade names are listed under Synthetic fibers (see).

Polyoxymethylene, abb. *POM, polyformaldehyde, polyacetal*: a thermoplastic formed by ionic polymerization of formaldehyde or its trimer, trioxane: $n\ H_2C=O \rightarrow [CH_2\text{-}O]_n$.

Properties. P. is very hard, stiff and tough down to -40°C, retains its shape when hot, does not absorb significant amounts of water, and has good sliding, wear and electrical properties. It is not soluble in the usual organic solvents (except in perfluorinated alcohols or ketones); its resistance to gasoline (including methanol-containing gasoline) and weak bases is of technological interest. P. is attacked by strong acids and oxidants. Its density is 1.41 to 1.42 g cm^{-3}, its softening point is between 178 and 183°C, its limit of bending stress is 105 to 120 N mm^{-2}, its impact cracking resistance is 6 to 8 N mm^{-1} and it can stretch by 20 to 40% under tension.

Production. The formaldehyde can polymerize by a cationic or anionic precipitation mechanism in aliphatic hydrocarbons, such as gasoline fractions, at 40 to 50°C under normal pressure. Amines, phosphines, metal carbonyls, alcoholates, etc. are used as catalysts. The high heats of reaction (about 65 kJ mol^{-1}) are removed by wall and reflux cooling. The gaseous formaldehyde is purified in a prereactor by cooling (condensation of water) and formation of paraformaldehyde. Formaldehyde, solvent and catalyst are continuously fed into the polymerization reactor in proportions which lead to a polymer suspension containing up to 15% P. To prevent depolymerization, which occurs by cleavage of formaldehyde, the terminal hydroxyl groups must be acetylated, which is done at about 130°C with acetic anhydride in the presence of sodium acetate and pyridine. The P. precipitates as a granulate (Fig.).

P. can also be produced by cationic polymerization of trioxane, which can polymerize in the absence of solvent and in the gas phase. Lewis acids and proton acids are suitable catalysts for this process. Recently, polymerization induced by irradiation of pure trioxane has become important. Here a very pure, molten trioxane is granulated and carried on a water-cooled belt through an electron beam. It is subsequently polymerized at 50 to 55°C, the unreacted trioxane is removed with solvents and recovered, and the P. is stabilized by acetylation.

The semiacetal terminal groups can also be stabilized by carrying out the polymerization of the formaldehyde or trioxane in the presence of a small amount of cyclic ethers or acetals (copolymerization). The copolymerization is followed by thermal or chemical treatment which removes formaldehyde from the oxymethylene chain until a stable co-monomer unit is reached, and this becomes the stable end group.

Processing and applications. The P. granulate is stabilized with antioxidants, acid trappers and light stabilizers. Depending on the intended use, internal lubricants, pigments, fillers (e.g. glass fibers), etc. can be added to the polymer. Most P. is worked by injection molding. Rods, pipes, profiles, sheets and films are made by extrusion or blowing. P. are used for household appliances, in automobiles, machines, apparatus and plumbing.

Historical. The first high polymer of formaldehyde, eupolyoxymethylene, was produced in the 1920's by J. von Staudinger. It was of no industrial importance, however, because of its instability. Methods for industrial production of stable P. were first developed in 1950 in the USA.

Polyparabanic acids: polycondensates with structures similar to those of the Polyhydantoins (see). P. are obtained from oxamic acid esters and isocyanates, and are used as insulators, glues and for synthesis of special fibers.
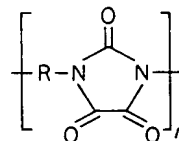
Polypeptide antibiotics: a group of antibiotics produced by bacteria of the genus *Bacillus*; their structures are distinctly different from normal pep-
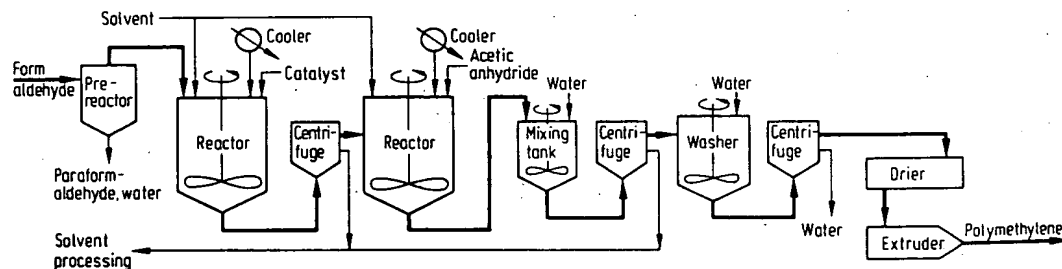
Process of polymethylene production.

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